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A SERVICE FOR INDUSTRY BUSINESS ENGINEERING AND RESEARCH
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Dear Sir:

Sales of uranium ores and concentrates made by Canada to the United States totaled $35,744,000 for the first five months of 1957. This compares with $17,504,000 for the corresponding period of 1956. For May, 1957, sales were $9,079,000 as against $4,604,000 in May, 1956. Increase in sales reflects new Canadian mining and milling capacity, some of which is already delivering against contracts and agreements to purchase uranium concentrates, totaling over $1.5 billion, let with mines by Eldorado Mining & Refining, the Canadian government purchasing agency.

Radiation development concept specifically designed to accelerate industrial progress in the process industries has been submitted to the USAEC by the CEM Group (Chemicals-Electronics-Metallurgy). The group is made up of General Aniline & Film Corp., Emerson Radio & Phonograph Corp., and Revere Copper & Brass, Inc. (Other BUSINESS NEWS, p. 2 this LETTER.)

Reduction in price of cobalt-60 and increase in source handling charge has been put into effect by the USAEC. New prices range from $2 to $5 per curie and are based on the specific activity (number of curies per gram of material) and the quantity purchased. For 5,000 to 25,000 curies a 15% discount is granted; over 25,000 curies the discount is 30%. Standard charge is $100 per order for source selection and handling.

Twenty-second Semi annual Report of the U.S. Atomic Energy Commission, issued last week (July 31st), covers Commission activities for the first half 1957. Not previously revealed was Commission work on nuclear propelled rockets, now in development stage at Los Alamos Scientific Laboratory (University of California operated) and also at the University's own radiation laboratory. The report may be obtained from Sup't. of Documents, Washington 25, D.C. at $1.25.

Conference to cover New Ideas in Instrumentation from Nuclear Developments is planned for November 7-8, in Philadelphia, under sponsorship of Instrument Society of America. Details, further information, from Warren Brand, Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.

Contract to design and construct 500,000 (thermal) kilowatt nuclear power station near Rome, Italy has been obtained by Vitro Engineering Co., division of Vitro Corp. of America. Contract, which represents first foreign nuclear power station job obtained by U.S. engineering firm, is with SIMEA (Societa Italiana Meridionale Energia Atomica), operating subsidiary of AGIP Nucleare, a company owned by the Italian government. Total cost of the project is estimated at 29 billion lira ($46,400,000); location will be central-southern Italy. Certain major components, including a pressurized water reactor, will be bought in the U.S., with other components and services to be from European sources wherever advantageous to the project. Vitro is now on the first phase of the contract which includes conceptual design of the station, development of capital and operating costs, and related services. Second phase of the contract, scheduled for 1958, covers preparation of final drawings, specifications, and procurement services.

ATOMIC ENERGY BUSINESS NEWS...

LICENSES GRANTED BY U.S. FIRM:- Fiat, S.p.A., large Italian industrial complex, has now signed agreement to build and sell full-scale nuclear power plants under license from Westinghouse Electric International Co. Under the licensing arrangement, Fiat will build nuclear reactors of the pressurized water type and other non-military types developed by Westinghouse, and will sell nuclear equipment outside Italy as well as within the country. The American company executed similar agreement recently with Belgium's largest electrical manufacturer, Ateliers de Constructions Electriques de Charleroi. Both companies receive access to Westinghouse design information on all non-military nuclear equipment. (Since the dollar availability of the Euratom countries is limited, with Belgium and Italy both members the agreement will be to the advantage of Westinghouse so far as its foreign exchange position is concerned. Plans of Euratom are to spend $5.5 billion in developing 15 million kilowatts of power from nuclear plants in the next ten years. A maximum of $1.1 billion will be spent outside the Euratom area which comprises Belgium, Italy, W. Germany, France, Holland, and Luxemburg. First Euratom order is scheduled to be placed late next year.)

Westinghouse Electric has now reported record sales for the quarter and six months ended June 30, with earnings also substantially up. Second quarter sales this year were the largest for any similar period in the company's history, totaling $507,253,000. Last year they were $380,731,000. Earnings for the first six months this year amounted to $30,615,000 or $1.77 per common share, compared with loss of $11,713,000 a year ago. In his report to stockholders last week, Gwilym A. Price, chairman and president, noted that new orders being entered on the books are keeping company backlogs at high levels. This is especially true, he said, in the apparatus, atomic, and general products group.

FUND AUTHORIZATION REDUCED:- Authorization requests of the USAEC, about to be made to Congress, have been reduced by the Bureau of the Budget from $435,148,000 to $217,200,000. Reduction was effected by lowering from $150 million to $20 million the reactor funds sought by the Commission to accelerate the atomic energy program; by eliminating a $20,000,000 item for a fuel element test reactor; and by reducing from $22,750,000 to $8,000,000 authorization for aircraft nuclear program test plant at Idaho Falls, Idaho. Request for thermonuclear program was increased by Budget Bureau from $5,000,000 to $7,750,000.

PROPOSALS TO DEVELOP NUCLEAR SHIP PROPULSION SYSTEM INVITED:- Invitation has been extended industrial firms to submit proposals for a merchant ship nuclear power plant consisting of a gas-cooled nuclear reactor coupled with a closed cycle gas turbine. USAEC and Maritime Administration, through an inter-agency group, are administering the Government's nuclear merchant ship program. Feasibility studies of this type of propulsion plant, completed by General Motors Corp., Ford Instrument Co. division of Sperry-Rand Corp., and General Atomic division of General Dynamics Corp., have indicated that further work should be undertaken to verify the high promise of this system. From among those submitting proposals, contractor will be selected to arrive at a firm design for a land based prototype plant. It is believed that construction of such a prototype can be completed within 5 to 7 years from contract award. (This gas-cooled reactor coupled with closed cycle gas turbine is a long range program; other work is now in progress on pressurized water nuclear propulsion plant for a merchant ship. Under this latter program, Babcock & Wilcox are working on a $9,872,000 contract to supply major components; preliminary design has been completed of the hull, and contract is to be awarded in the next few months. Launching is scheduled for 1960.)

ATOMIC ENERGY PATENT DIGEST...latest grants ...

ISSUED July 23, 1957 TO GOVERNMENTAL ORGANIZATIONS:- (1) Uranium recovery from ores with hydrochloric acid and acetone. R. B. Kimball, R. A. Ewing, inventors. No. 2,800,387 to USAEC. (2) Marking fluoroscope head. T. B. Correy, M. H. Taylor, inventors. No. 2,800,588 to USAEC. (3) Crystal dosimeter. P. W. Levy, inventor. No. 2,800,589 to USAEC.

ISSUED July 23, 1957 TO PRIVATE ORGANIZATIONS:- (1) Radiation measuring system for material having non-uniform cross-section design. S. Gilman, inventor. No. 2,800,590 to Curtiss-Wright Corp.

ISSUED July 30, 1957 TO GOVERNMENTAL ORGANIZATIONS:- (1) Proportional waste line sampler. J. F. Honstead, inventor, No. 2,800,797 to USAEC. (2) Compound action gain control. T. H. Quinn, inventor. No. 2,801,302 to USAEC.

DEVELOPMENT OF NUCLEAR POWER IN THE UNITED STATES; Condensation of remarks by W. Kenneth Davis, director, division of reactor development, USAEC, at Midwest Regional Conference of Council of State Governments, Cleveland, Ohio, July 22, 1957.

The U.S. nuclear program is unique in many ways. One unusual aspect is that the U.S. Government as a matter of national policy is developing a new industrial technology which (a) does not have an immediate economic requirement to justify it, (b) will be utilized primarily by private and public utilities already in existence, and (c) must be provided for and supplied by private industrial enterprises.

During the early years when nuclear power stations are still experimental in nature, utilities may form groups, as many of them already have, to carry out nuclear power projects. However, when the development has reached a more nearly commercial stage, nuclear power stations will be treated in most respects just as conventional power plants are today: individual utilities will finance, contract for, operate and maintain the nuclear power stations. The utilities will not actually build the plants nor do development leading to their construction. Rather, they will purchase the plants through enterprises which will become established in the business.

The rate of growth of a nuclear power industry depends on several factors: speed of development work, transition to private industry under favorable circumstances, and the eventual economics of nuclear power as compared with conventional sources of power. Sale, construction and operation abroad of nuclear reactors developed in the U.S. should give experience and improvements to aid the success of economic use in the U.S.

Estimates recently made by us, as projected, suggest there will be about 1 million electrical KW of nuclear power station capacity operating in five years; about 7½ million in 10 years; 43 million in 15 years; and 133 million in 20 years, which is the same as the total electrical generating capacity in the U.S. at the present time. However, by that time (1977) the nuclear capacity will still only be about one-quarter the total U.S. electrical generating capacity. These estimate must be treated with caution; they do lead to the conviction that nuclear electric power will be a large and rapidly expanding business during the next two decades.

There has been a great deal of discussion about the position of the U.S. in some kind of a hypothetical "nuclear kilowatt race" with the U. K. and Soviet Union.

The USSR program as described in a reply to a U.N. questionnaire and in a series of papers presented at the Belgrade meeting of the World Power Conference includes full scale power reactors of the pressurized water and water cooled graphite types with reactor experiments for four other types: aqueous homogeneous, fast breeder, sodium graphite, and boining water. (The proposed Russian pressurized water reactor is interesting. Its design is similar to the U.S.'s Shippingport, Pa., PWR in every respect except that a turbogenerator capacity of 210,000 electrical KW per reactor is planned as compared with 100,000 KW for the U.S. design. This is to be accomplished with three 70,000 KW turbogenerators which may indicate that all three will only be installed if the reactor can be run at that high a power level.)

There has been some misunderstanding of our opinion of the U. K. power reactor program. In view of their circumstances and their capabilities there is no question but they are pursuing what for them is a very sound and necessary course. Difficulties arise because there are people who seem to believe that what is a good program for the U. K. must be a good program for the U.S. They ignore the differences in our needs, our economics and economies, and our background in nuclear energy. We are charged with being backward because we are not following the U. K. pattern and because we do not have plans for as much or more nuclear power by any given date. The British have done an excellent job in developing the gas cooled, graphite moderated reactor and are exploiting its capabilities to a very high degree in the Central Electricity Authority reactors to be completed in 1961 and thereafter. According to their own figures, however (changing them only to reflect U.S. financing costs), we find that power from extremely large gas cooled reactors will cost more than power from conventional U.S. power plants in 1980, and will only drop below this cost by 1990. In addition, these gas cooled reactor would probably cost 50 to 60% more if built in the U.S. The blunt fact of the matter is that we have got to develop reactors which are more economic than the gas cooled graphite reactor or we are not going to have economic nuclear power in the U.S. Also of interest is that although the British are heavily committed to the gas cooled graphite reactor, they are also interested in other types of reactors.

ISOTOPES & OUR ATOMIC FUTURE; Condensation of remarks by Willard F. Libby, Commissioner, USAEC, at Hazelton, Pa., July 30, 1957. (At opening of nuclear division plant of The Beryllium Corp.)

I want to talk about isotopes and their applications. First let us consider their production. They may be made in several ways. Since the action of fission itself produces radioactive atoms in major quantities, we get about 150 different fission products of various characteristics by chemical or physical separation of the "atomic ashes" of power and production reactors.

Four important isotopes of technological importance which are fission products are krypton-85, finding use in radioactive signal lamps and flashlights; iodine-131, used widely in thyroid diagnosis; cesium-137 which has great potentiality as a cheap gamma ray source; and strontium-90, an excellent beta ray source, cheap and long-lived, and an excellent material for such applications as luminescent paint.

In addition to these, several other fission products are quite likely to prove useful. Other sources of isotopes include those produced by neutron capture, such as radioactive carbon.

Now let us consider applications and uses. We estimate that present savings from use of isotopes approximate half a billion dollars per year for industrial and agricultural organizations. This has been accomplished at a cost to the government of about $3 million per year. I estimate that by 1960 these savings will attain $5 billion per year at an annual cost to the government not greater than $20 million.

The known applications of radioisotope techniques have by no means saturated the market. It is estimated, for example, that the market for radioisotope thickness gauges is less than 20% saturated. Such installations on the average have been found to pay off the initial investment in less than a year. A comparatively new use of radioisotopes is to facilitate oil well stimulation. This newly born use for radioactive tracers, as indicated by the reported savings of $180 million per year, represents a large potential source of profit to the oil industry. Other applications are in the organic chemical industries, which do not at the present time make any important use of either radioactive carbon or radioactive hydrogen, the two most important elements with which they work. It is obvious that there are applications of extreme importance to every organic chemical industry for controlling production operations by judicious labeling of the material being processed.

An important potential development in the use of isotopes is in radioactive drugs and medicinals as well as organic chemicals. In many instances these substances must be grown rather than synthesized in the laboratory. An isotope farm, established some six or seven years ago at Argonne National Laboratory, Lemont, Ill., has given us a barnful of radioactive plants of many different types, ready for chemical extraction and separation to produce medicinals and chemicals.

Currently, nearly 100 private firms in the U.S. are doing radioisotope processing and redistribution; this compares with 17 such firms in 1951. With the rapidly growing industrial demand for radiation sources, several firms are presently expanding their radiation processing facilities very significantly.

For the first time since the USAEC started radioisotope distribution in 1946, the economic feasibility of private enterprise participation in radioisotope production seems imminent. One company has announced its intention to construct a reactor for the production of process steam and cobalt-60 at the rate of 1 million curies per year. This will be the first privately-owned reactor for large scale production of radioisotopes. (The USAEC is making available for civilian use in 1957 some 300,000 curies of cobalt-60. At present, the USAEC is constructing a multicurie fission products pilot plant at Oak Ridge National Laboratory, to help meet the demands for long-lived radioactive fission products. The plant will also serve as pilot plant for future industrial fission product separation plants. To be ready for production this Fall, the facility will have capacity for separating 200,000 curies per year of cesium-137. In addition, substantial quantities of strontium-90, cerium-144, and technetium-99 will be recovered from radioactive wastes. These are radioisotopes widely used in medical research and therapy, physical research and industry.)

There are many potential large scale uses for radioisotopes and radiation that as yet have not made an appearance. Those presently in use are paying a fair return on the entire capital investment in the atomic energy program, and we look to annual savings of $5 billion in industrial processing and agricultural costs within three to five years.

PRODUCTS, PROCESSES & INSTRUMENTS...manufacturers' news...

PRODUCTS INTRODUCED BY MANUFACTURERS:- Density of liquids may be measured with new gauge of Ohmart Corp., Cincinnati, using lead shielded radioactive source. The unit, with external measuring components, measures the percent of solids in liquids in addition to the density and can be used on pipes 3-in. or larger. Operation is said to be unaffected by temperature, pressure, and viscosity changes.

New grease base, GA 10, of Oronite Chemical, is said to be useful after a dose of 500 megaroentgens of gamma rays. This radiation resistance is one of its advantages over ordinary sodium sterate greases which Oronite says will be severely damaged by a dose of about 100 megaroentgens. (The 500 megaroentgen dose is equivalent to about a year's service in valves controlling the flow of liquid sodium in a nuclear reactor.)

New linear electron accelerator of Mullard Ltd., London WC1, England, is said to be useful for both laboratory applications or industrial electron irradiation. The accelerator can be designed for any beam energy in the range 2 to 5 MEV.

MANUFACTURERS' NEWS:- Particle accelerator of 1 MEV energy has been ordered from High Voltage Engineering Corp., Burlington, Mass., by New York University. It will be used in the nuclear engineering curriculum.

Some $97,000 in uranium rods were air lifted last week to the Atomic Energy Institute of the University of Sao Paulo, in first shipment of fuel for the research reactor of the Institute. Manufactured by Babcock & Wilcox, the fuel elements are made up of 29.99 kg of uranium enriched to 20% by 5.9 kg of uranium-235.

New subsidiary company, Tracerlab (Holland) N.V., has been established with sales offices in Amsterdam, Holland; products of the parent nucleonic products firm, Tracerlab, Inc., Waltham, Mass., will be stocked by the subsidiary. The company, which also has offices in Paris, France, has distributors for its products in Germany, Sweden, Denmark, Austria, Italy and Switzerland.

MANUFACTURERS' LITERATURE:- Heat-resistant titanium carbide alloys and their use in equipment for nuclear energy applications are shown in new bulletin No. B-444 on Kentanium, issued by Kennametal, Inc., Latrobe, Pa. Simple and complex shapes that have been used successfully at temperatures ranging to above 1800 deg. F. are illustrated.

Filters for nuclear power applications are shown in brochure No. 54-102 of Cuno Engineering Corp., Meriden, Conn.

Catalog sheet giving operational details and complete specifications of its new model LM-48 lab monitor is available from Radiation Instrument Development Laboratory, 5737 So. Halsted St., Chicago 21, Ill. Model LM-48 is designed for routine laboratory contamination measurements including contamination from very low energy beta emitters, such as carbon-14 or sulfur-35, and from alpha emitters.

INTERNATIONAL NEWS...in the nuclear field...

FRANCE:- Some $658 million have been allotted to the French Atomic Energy Commission for development work in the next five years, in an action of the French National Assembly. Of the allocation, $70 million is to assist with the $168 million cost of a uranium isotope separation plant, while $28 million will be for the Commission's operating expenses. Balance will be for the Commission's participation in the complete French five-year nuclear energy program.

ITALY:- Government of Italy and the World Bank are now to cooperate in a study which will lead to construction of a large nuclear power station in Southern Italy. Eugene R. Black, president of the World Bank, noted that the Bank has already invested more than one billion dollars in power projects throughout the world. This nuclear power study points the way to Bank lending operations in this new field, he said. The study, to be known as project ENSI (Energia Nucleare sud Italia), will embrace: (1) selection of site for nuclear power station, (2) invitations to be sent qualified manufacturers to bid on nuclear power plant of approximately 150,000 KW electrical capacity, and (3) evaluation of bids. Panel will be set up by World Bank to evalute bids.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER

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